STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION
Jim Gibbons, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

27 August 2008

NOTICE OF DECISION

WATER POLLUTION CONTROL PERMIT
NUMBER NEV2007106

Cortez Joint Venture dba Cortez Gold Mines

Cortez Hills Expansion Project

The Nevada Division of Environmental Protection has decided to issue Water Pollution Control Permit NEV2007106 to the Cortez Joint Venture dba Cortez Gold Mines. This permit authorizes the construction, operation, and closure of approved mining facilities in Lander County. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through NAC 445A.447, to assure the Division that the groundwater quality will not be degraded by this operation, and that public safety and health will be protected.

The permit will become effective 11 September 2008. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, 05 September 2008, on Form 3, with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada 89701-5249. For more information, contact Miles Shaw at (775) 687-9409 or visit the Division's Bureau of Mining Regulation website at www.ndep.nv.gov/bmrr/bmrr01.htm.

Comments were received during the public comment period, which ended 18 August 2008, in a letter submitted by e-mail from Great Basin Resource Watch (GBRW). Comment excerpts from the letter with responses by the Bureau of Mining Regulation and Reclamation (BMRR) follow.

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RESPONSE TO COMMENTS

The following are verbatim excerpts from an 18 August 2008 comment letter and attachment, "*Review of Water Pollution Control Permit Application NEV2007106, Cortez Hills Mine, August 12, 2008*", received by e-mail attachment on 18 August 2008, from John Hadder, Staff Scientist, Great Basin Resource Watch (GBRW). The first two (2) comments are from Mr. Hadder's cover letter and the balance of the comments are from the review prepared for GBRW by Tom Myers, Ph.D., Hydrologic Consultant. The BMRR responses follow the GBRW comments in *italics*.

GBRW 1: "The fact sheet states, *"The predicted pit water chemistry meets applicable water quality standards for most parameter, with the exception of arsenic and thallium, which exhibit natural elevated background concentrations in the regional groundwater and are further enhanced by evapoconcentration effects associated with the terminal lake."* (pg. 19). There needs to be longterm groundwater monitoring not only of the pit lake but also of the groundwater surrounding the pit lake in the event that the conclusion that the pit lake is not completely terminal. Furthermore, if the prediction above is correct the water will be substandard (GBRW understands that the thallium levels may be a artifact), and the mining operation will have created a toxic surface water resource that was not present prior to mining, and should not be permitted. The permit should require the Cortez Hills Mine secure acceptable surface water quality in the pit lake or develop a plan to appropriately backfill the pit to avoid the creation of a toxic lake."

BMRR 1: There will be groundwater monitoring during the closure and reclamation period post-mining which would identify potential water quality impacts. Furthermore, monitoring of pit lake chemistry is a component funded, if needed, by the Long-Term Contingency Fund agreement between the Bureau of Land Management and Cortez Gold Mines.

The predicted water quality does not represent a toxic water body. The pit lake is anticipated to be terminal and therefore would not affect groundwater or drinking water supplies. Based on the ecological risk assessment conducted as part of the pit lake study, the resulting water quality would not pose a risk to wildlife (see Appendix VII).

GBRW 2: "The remainder of the water issues are addressed by Tom Myers (see below) in his review. In summary, GBRW is concerned that the number, spacing, and specific locations of groundwater monitoring wells is insufficient, and more detailed analysis is needed to elucidate an optimal configuration. We urge NDEP to use the precautionary principle in using modeling results as primary guidance in deciding the monitoring well plan, i.e., expect shortcomings so it is better to oversample a bit than have fractious data if a problem arises. In particular, Meyers points out the complication of preferential flow, which is poorly modeled, and will tend to create channels with higher contaminant concentrations."

BMRR 2: Comment noted.

GBRW 3: "The subject water pollution control permit is for a new permit for the proposed Cortez Hills Mine expansion of the Pipeline Project Mine. The permit primarily established monitoring for the waste rock and heap facilities; there are no proposed new tailings facilities but the existing facility at the Cortez mine will be expanded. This expansion is not monitored in this permit but is part of permit NEV0000023."

BMRR 3: The referenced tailings impoundment - TA-7, located at the Cortez Gold Mine Project (Water Pollution Control Permit NEV0000023) – is included in the new Water Pollution Control Permit NEV2007106 (Permit) for the Cortez Hills Expansion Project, although no milling of ore or discharge of tailings to TA-7 is currently planned. Cortez Mill #1 has not been transferred, however, individual Permit Schedule of Compliance (SOC) items require that the integrity of the Cortez Mill #1 be demonstrated prior to any operation and that engineering designs be re-submitted to BMRR for review and approval prior to any expansion of the TA-7 impoundment. Routine monitoring and sampling, as applicable, of all leak detection systems, impoundment piezometers, impounded and underdrain solutions, and monitoring wells associated with TA-7 are included in the Permit Monitoring Requirements, Part I.D.

GBRW 4: "The waste rock to be placed in the various dumps has little acid-generating capability, but there is certainly a potential to leach arsenic and other trace elements. For example, the humidity cell results all showed a maximum As concentration several orders of magnitude greater than the standard. The modeling done by Geomega assumes attenuation, but this cannot be depended
on because of preferential flow. The whole rock analysis for Se results in mean values for both the pit and underground mine area that would cause the rock to be isolated in the coal-mining regions of West Virginia so that it would not leach into surface water; the standard is 1 mg/kg of rock with rock that exceeds these values being encapsulated. The neutral to alkaline conditions at Cortez Hills would facilitate Se transport; acid conditions cause Se to be immobile. The average Se concentration in the humidity cells equals the aquatic standard. This is not to argue for similar treatment, but it should highlight the need for adequate monitoring of the waste rock."

BMRR 4: Humidity cell tests, which simulate extreme weathering conditions, produced a maximum arsenic (As) value of 0.56 mg/L, which is approximately one (1) order of magnitude above the BMRR Profile I standard of 0.05 mg/L As. The average value obtained through the humidity cell test work was 0.05 mg/L As. Based on model simulations using the test work results, vadose-zone waste rock effluent reaching groundwater would contain a predicted maximum 0.003 mg/L As. Finally, the results of background sampling of potential receiving waters routinely exceed the Profile I standard for As due to natural conditions.

Leaching tests indicated that selenium (Se) concentrations in the leachate would be below the applicable groundwater standard.

Leachate chemistry from waste rock will be monitored and reported quarterly, in accordance with the Permit, via 1) Meteoric Water Mobility Procedure (MWMP) testing to determine the potential for solute leaching and 2) Profile I sampling and analysis of upgradient and downgradient monitoring wells.

GBRW 5: "The depth to groundwater exceeds hundreds of feet under much of the waste rock (Waste Rock Management Plan, pages 68-71), therefore modeling unsaturated flow often suggests that years may be required before any seepage reaches the groundwater – here it suggests six to more than 40 years for shallow depths. The modeling always fails to include preferential flow – either finger flow through alluvium or fracture flow. Because of the potential for high concentrations of various contaminants, which will not attenuate especially with preferential flow, monitoring wells should be up- and downgradient of the dumps. The downgradient wells should be some distance from the dump to allow for horizontal flow in the unsaturated zone between the dump and the groundwater. Cortez should provide an analysis of the potential

horizontal flow prior to establishing the exact location. The upgradient wells should be above potential dispersion to establish natural baseline conditions."

BMRR 5: Upgradient and downgradient water quality monitoring wells, with quarterly sampling and reporting, are Permit requirements.

Groundwater flow is characterized in Section 2 of Appendix III of the Permit application. In particular, Figures 2-6 though 2-9 illustrate the direction of flow downgradient of the waste rock facilities and the screened intervals of the monitoring wells. At these downgradient distances and with the required screened intervals, modification in water chemistry due to leachate from waste rock facilities would be detectable.

GBRW 6: "An exception is the Canyon Dump which has an area of alluvial groundwater just 50 feet below the ground surface. This aquifer should be monitored near the edge of the dump.

The WPCP application states that well CHMW-01 is downgradient of the Canyon Waste Rock Facility. Based on Figure 5-1 and Figure 2-7, this is not correct. The groundwater contour map suggests the groundwater flows toward this dump from all but the northwest side, toward which it discharges. An additional monitoring well should be completed that is actually northwest of the dump, but that does cause confusion with monitoring of the North Waste Rock Dump, as discussed in the next paragraph.

Monitoring well MW-96 is downgradient of the North West Rock Dump, as stated in the application. However, it is only slightly further downgradient from the Canyon Waste Rock Facility. It should be moved so that it is north of west (i.e. just a bit north from the west side of the facility) from the North Waste Rock Dump so that there is no question about what it is monitoring."

BMRR 6: Figure 2-7 of Appendix III of the Permit application shows that groundwater flows from south to north in the area of the Canyon Waste Rock Facility, and from southeast to northwest in the area of the North Waste Rock Facility. Therefore, CHMW-01 is downgradient of the southern portion of the Canyon Waste Rock Facility.

The Monitoring Plan Table in Section 5.0 of the Permit application inadvertently lists MW-96 as downgradient of the North Waste Rock Facility, when, in fact, the well is located downgradient of the Canyon Waste Rock Facility. This correction will be made in the Permit application materials.

Per the Permit Part I.D.10, an additional monitoring well, MW-100, will also monitor water quality downgradient of North Waste Rock Facility. Therefore, there would be no ambiguity in monitoring impacts of the North versus the Canyon Waste Rock Facilities.

GBRW 7: "Because of the depth to groundwater noted above, by the time monitoring wells reveal contaminants in the groundwater, there would have been a large slug of drainage in the unsaturated zone which will continue to flow to the groundwater for at least as long as the time since the waste rock was constructed. Contaminants in the unsaturated zone are very difficult and expensive to remediate. Therefore, Cortez should install an unsaturated monitoring system along the toe of the waste rock dump to prevent the accumulation within the unsaturated zone of a large slug of contaminants."

BMRR 7: Infiltrating waters and solutes are anticipated to either migrate toward groundwater or appear as surface water at the toe of the waste rock facilities. In either event, the effects of solute transport on water quality will be monitored. Attenuation of dissolved solutes by the vadose zone is discussed in Section 5.4 of Appendix IV of the Permit application, and a "large slug" of solutes is not anticipated.

In addition, the leachability of waste rock placed in the facilities will be tested and reported in accordance with the Permit via the Meteoric Water Mobility Procedure on a quarterly frequency. If solute leachability in excess of predicted concentrations were detected, additional controls to minimize solute leaching and/or enhanced monitoring would be implemented.

GBRW 8: "Geomega did extensive vadose zone flow and transport modeling (see the Waste Rock Management Plan, sections 4.5 and 4.6). The modeling results suggest that seepage from the waste rock will not reach the groundwater for many years and that most contaminants leaching from the waste rock will either attenuate in the waste rock or in the unsaturated zone before reaching the groundwater. This modeling is not based on calibrated data. There are mines in Nevada for which seepage from mine facilities reaches the groundwater; in these instances attenuation did not prevent it. Geomega should provide much more justification for its use of attenuation, including field data from the site or similar sites showing the attenuation rates. This modeling should not provide a sense of security regarding the use of monitoring wells."

BMRR 8: The modeling utilized test work performed using waste rock leachate and site specific alluvium from the area beneath the proposed waste rock facilities. Therefore, the tests and modeling do reflect site-specific geochemical conditions. Other mines at other locations would most likely have waste rock effluent and subsurface alluvium with different characteristics.

Additionally, there are more than 20 analogous waste rock facilities near the proposed facilities, associated with historic mining operations and modern mining operations at the permitted Cortez Gold Mine Project (NEV0000023), the Gold Acres Heap Leach Project (NEV0094102), and the Pipeline Project (NEV0093109). These waste rock facilities contain rock chemically similar to the materials that would be placed in the proposed facilities and, based on routine monitoring in accordance with the respective permits, none of the existing facilities have seepage that has affected water quality.

GBRW 9: "The design of the Canyon Waste Rock Dump may allow water to collect in certain areas, so the one-dimensional analysis of flow through the dump as completed by Geomega may be inaccurate. As noted in the fact sheet (page 9), the dump is bounded on three sides by the "native topography". It is likely the dump rock is more conductive than the natural soils and rock outcrops, therefore any water reaching the base of the dump will likely flow along the base to the low point where it will be focused. The seepage rate at this point into the soil will be much higher than calculated by Geomega's modeling. The modeling did not account for this more focused flow."

BMRR 9: The Canyon Waste Rock Facility is an engineered facility with engineered stormwater diversions designed to avoid focusing flow and to control stormwater run-on to the dump. The detailed stormwater designs are provided in Appendix V of the Permit application.

GBRW 10: "The modeling discussion (WPCP Waste Rock Management Plan, pages 119-121) refers to flux rates equilibrating at different time periods dependent on the waste rock dump's variable thickness. This could be substantially wrong because it appears the model start time is the end of dump construction. The initial moisture is a background level for mined waste rock; it begins to increase at the beginning of the model period. The reality is that the moisture content will be to increase as soon as the waste rock is placed. The time to maximum flux rate may be much shorter than expected."

BMRR 10: The initial moisture content of the waste rock facilities was taken to be conservatively high (see page 49 of Appendix IV). Therefore, the simulation conservatively over-predicts the amount of moisture in the waste rock and the amount of potential seepage.

GBRW 11: "Model-predicted seepage through the base of the dump is 1.4 to 7.2 in/y. This rate is substantially higher than natural recharge rate at this location."

BMRR 11: This is an artifact of conservatively setting the high initial moisture content in the waste rock model as referenced in response BMRR 10.

GBRW 12: "Cortez proposes two alluvial and two bedrock monitoring wells downgradient of the new Grass Valley heap leach facility and one in the bedrock upgradient (WPCP Application, page 25-26). The distance from the heap to the alluvial monitoring wells, according to Figure 5-1, is about a mile (to wells PD-06 and PD-08). The time for transport to these wells, after transport through the unsaturated zone, is unacceptably long. As for the proposed bedrock wells, the alluvial wells should be within 250 feet of the facility. At 250 feet, the number of alluvial monitoring wells will be insufficient to assure that contaminants will be sampled. Contaminants in seepage reaching the alluvial water would begin to disperse; if the well lies within the dispersal pattern, it will sample the contaminant. Thus, the alluvial monitoring should be improved so that the wells are no more than 250 feet downgradient of the facility (to assure transport periods are not too long) and so that the wells are spaced close enough that they will capture all of the potential dispersal pathways. NDEP should require Cortez to perform an a flow path analysis contaminant dispersal in the alluvial aquifer to determine the correct spacing."

BMRR 12: Groundwater lies at a minimum depth of 185 feet beneath the Grass Valley Heap Leach Facility. To minimize the potential for a release to the environment, the Grass Valley Heap Leach Facility will be constructed with an 80-mil HDPE primary liner placed over a 1-foot thick low hydraulic conductivity layer to be constructed with a maximum permeability (k-value) no greater than 1 x 10^{-6} cm/sec. The pad is also designed with a constant gradient and an underdrain solution collection system to minimize hydraulic head on the liner system. The associated solution ponds are to be constructed with synthetic (HDPE) primary and secondary liners with leak detection systems and all solutions are conveyed within and all pipelines run within HDPE-lined channels.

The alluvium beneath the Grass Valley Heap Leach Facility is unsaturated. The proposed groundwater quality monitoring wells (one mile south of the facility) monitor the nearest saturated alluvium. There is no need for more detailed alluvial groundwater monitoring in the vicinity of the facility, because there is no alluvial groundwater present.

GBRW 13: "In the bedrock, fractures complicate the situation. The downgradient bedrock wells will be within 250 feet of the facility (WPCP Application, page 26). The flow pathways will

predominate along the fractures. If the monitoring wells sample the fracture system into which the contaminants have leached, they will sample the contaminant. However, if fractures are missed, contaminants within them will not be sampled. Because of the way the bedrock groundwater is segmented by faults and fractures, it is likely the sampling regime is insufficient. Cortez should either decrease the bedrock spacing to about every 200 feet along the downgradient half of the facility, or conduct a fracture trace analysis to actually map the fractures and plan for a monitoring well within each."

BMRR 13: Because of the low hydraulic conductivity of the subjacent bedrock, the proposed monitoring wells would be installed to intercept fractures in order to produce water (refer to Section 2.1.2 of Appendix III and Geomega (2006) "Cortez Hills Expansion Project Baseline Characterization Report", Table 4-8). Therefore, the proposed monitoring wells will sample water in fractures downgradient of the Grass Valley Heap Leach Facility.

GBRW 14: "The monitoring plan calls for removal of one well volume prior to sampling so that water which has resided within the well bore for a long period is not sampled. Removal of that volume should follow low flow purge procedures because otherwise the rapid removal of the water will cause a localized drawdown, which will draw groundwater equally from all directions, including downgradient. This could dilute the contaminants reaching the well from upgradient. The goal of the purging is not to disrupt the natural flow pathways, therefore low flow purge methods are essential."

BMRR 14: Monitoring well sampling is conducted using a micropurge unit that purges the wells at a rate of less than one liter per minute.

GBRW 15: "Additionally, the permit application, the permit, and NDEP should provide some guidance about the screened interval. If NDEP has such guidance, please provide it in response to this comment. Contaminants do not disperse vertically immediately on reaching the groundwater; rather there would be a vertical concentration gradient from the maximum at the water table (or in the capillary zone) to a minimum at some point below the surface. If the hydraulic properties and gradient are the constant over the screen, a monitoring well will draw as much flow from the bottom as from the top. The monitoring well therefore effectively mixes contaminated water with cleaner, deep water; the resulting monitoring well concentration is substantially below the level at the water table. If the groundwater discharges to a spring or seeps to a stream, the spring or seep may have the maximum concentration. Cortez should specify the screen length or how they will determine it in the field. One possibility is to screen an entire confined aquifer, although this allow some mixing it represents the discharge from that aquifer, and to screen the top 20 feet of a phreatic or water table aquifer."

BMRR 15: The BMRR is currently updating its monitoring well design requirements and guidance document dated October 1990. The updated guidance will formalize requirements implemented during the past five (5) years by the BMRR for monitor well engineering design approvals, which has required the constructed screen interval extend no more than five (5) feet above or twenty (20) feet below the pre-mining groundwater elevation. All new monitoring wells in the Permit, and any future monitoring wells, will be constructed to this design requirement.

GBRW 16: "The estimate for dewatering, 8200 gpm or 13,200 af/y, exceeds the expected recharge in that area of the Cortez Mountains. Dewatering for this project will cause the infiltration at the Pipeline Mine to be continued for an additional period of years, although the

rates once Pipeline ceases to dewater will be less. The Pipeline Infiltration basin permit should be amended to reflect the new source of water. Cortez should also analyze whether mixing the new water with the background water at the infiltration basins will cause water quality issues. For example, the Cortez Hills baseline water chemistry table (WPCP Application, pages 19-20) show that iron and manganese concentrations are much above standards. How will this affect the water quality at the infiltration basins?"

BMRR 16: Water discharge to the Pipeline Infiltration Project infiltration sites must meet requirements, including specific Profile I water quality standards, contained in the respective Water Pollution Control Permit NEV0095111, which was renewed in October 2006. In brief, water that does not meet the NEV0095111 standards is handled in a separate containment and conveyance system and may only be used consumptively for mill or heap leach operations at the Pipeline Project in accordance with Water Pollution Control Permit NEV0093109. Therefore, there will be no affect on water quality at the infiltration basins.